

Amendments to the Claims

Claims 1-39 (**Canceled**)

Claim 40 (**New**) A method for processing a substrate, said method comprising:
providing a substrate having fine grooves in a surface of the substrate and a seed layer on a surface of the fine grooves;
forming a plated film on the seed layer by electroplating with applying a voltage to the seed layer;
etching the plated film by reversing the voltage; and
annealing the plated film after said etching.

Claim 41 (**New**) A method according to claim 40, wherein said annealing is conducted at a temperature of 300 to 400°C.

Claim 42 (**New**) A method according to claim 41, further comprising cooling the substrate by a cooling device after said annealing.

Claim 43 (**New**) A method according to claim 41, wherein said annealing is conducted in an inert gas atmosphere.

Claim 44 (**New**) A method according to claim 43, wherein the inert gas is nitrogen gas.

Claim 45 (**New**) A method according to claim 41, wherein said annealing is conducted while flowing an antioxidant gas.

Claim 46 (**New**) A method according to claim 45, wherein the antioxidant gas flows along a surface of the substrate.

Claim 47 (**New**) A method according to claim 40, further comprising bevel-etching the substrate to remove the plated film only on a peripheral portion of the substrate before said annealing.

Claim 48 (**New**) A method according to claim 47, wherein an edge cut width of the substrate is set in the range of 2 mm to 5 mm in said bevel-etching.

Claim 49 (**New**) A method according to claim 40, further comprising chemical mechanical polishing the substrate to remove the plated film on the substrate while leaving the plated film in the fine grooves of the substrate after said annealing.

Claim 50 (**New**) A method according to claim 49, wherein said chemical mechanical polishing is conducted by using a fixed abrasive.

Claim 51 (**New**) A method according to claim 49, further comprising forming a protective film on a polished surface of the plated film in the fine grooves.

Claim 52 (**New**) A method according to claim 40, further comprising reinforcing the seed layer in the fine grooves by plating.

Claim 53 (**New**) A method according to claim 52, wherein the plating is electroplating.

Claim 54 (**New**) A method according to claim 52, wherein the plating is electroless plating.

Claim 55 (**New**) A method according to claim 40, further comprising measuring a thickness of the plated film on the substrate after said etching or after said annealing.

Claim 56 (**New**) A method according to claim 40, further comprising:
transferring the substrate having the plated film by a first hand of a robot to a cleaning unit;
cleaning and then drying the substrate by the cleaning unit after said annealing; and

transferring the cleaned and dried substrate by a second hand of the robot.

Claim 57 **(New)** A method according to claim 40, wherein the electroplating is conducted in a plating liquid in a plating container, a concentration of components in the plating liquid is adjusted in a regulating tank, and then supplied from the regulating tank to the plating container.

Claim 58 **(New)** A method according to claim 57, wherein the concentration of components in the plating liquid in the regulating tank is measured.

Claim 59 **(New)** A method according to claim 40, wherein the electroplating is conducted with regulating electric current flowing in a vicinity of a peripheral portion of the substrate.

Claim 60 **(New)** A method according to claim 40, wherein the plated film is copper.

Claim 61 **(New)** A method for processing a substrate, said method comprising:
providing a substrate having fine grooves in a surface of the substrate and a seed layer on a surface of the fine grooves;
forming a plated film on the seed layer by electroplating with supplying a first current by a voltage to the seed layer and then supplying a second current to the seed layer; and
annealing the substrate having the plated film.

Claim 62 **(New)** A method according to claim 61, wherein the second current is larger than the first current.

Claim 63 **(New)** A method according to claim 61, further comprising etching the plated film formed on the substrate by reversing the voltage applied to the seed layer.

Claim 64 **(New)** A method according to claim 61, wherein said annealing is conducted at a temperature of 300 to 400°C.

Claim 65 **(New)** A method according to claim 64, further comprising cooling the substrate by a cooling device after said annealing.

Claim 66 **(New)** A method according to claim 64, wherein said annealing is conducted in an inert gas atmosphere.

Claim 67 **(New)** A method according to claim 66, wherein the inert gas is nitrogen gas.

Claim 68 **(New)** A method according to claim 64, wherein said annealing is conducted while flowing an antioxidant gas.

Claim 69 **(New)** A method according to claim 68, wherein the antioxidant gas flows along a surface of the substrate.

Claim 70 **(New)** A method according to claim 62, further comprising bevel-etching the substrate to remove the plated film only on a peripheral portion of the substrate before said annealing.

Claim 71 **(New)** A method according to claim 70, wherein an edge cut width of the substrate is set in the range of 2 mm to 5 mm in said bevel-etching.

Claim 72 **(New)** A method according to claim 62, further comprising chemical mechanical polishing the substrate to remove the plated film on the substrate while leaving the plated film in the fine grooves of the substrate after said annealing.

Claim 73 **(New)** A method according to claim 72, wherein said chemical mechanical polishing is conducted by using a fixed abrasive.

Claim 74 **(New)** A method according to claim 72, further comprising forming a protective film on a polished surface of the plated film in the fine grooves.

Claim 75 (**New**) A method according to claim 61, further comprising reinforcing the seed layer in the fine grooves by plating.

Claim 76 (**New**) A method according to claim 75, wherein the plating is electroplating.

Claim 77 (**New**) A method according to claim 75, wherein the plating is electroless plating.

Claim 78 (**New**) A method according to claim 61, further comprising measuring a thickness of the plated film on the substrate after etching or after said annealing.

Claim 79 (**New**) A method according to claim 62, further comprising:
transferring the substrate having the plated film by a first hand of a robot to a cleaning unit;
cleaning and then drying the substrate by the cleaning unit after said annealing; and
transferring the cleaned and dried substrate by a second hand of the robot.

Claim 80 (**New**) A method according to claim 61, wherein the electroplating is conducted in a plating liquid in a plating container, a concentration of components in the plating liquid is adjusted in a regulating tank, and then supplied from the regulating tank to the plating container.

Claim 81 (**New**) A method according to claim 80, wherein the concentration of components in the plating liquid in the regulating tank is measured.

Claim 82 (**New**) A method according to claim 61, wherein the electroplating is conducted with regulating electric current flowing in a vicinity of a peripheral portion of the substrate.

Claim 83 (**New**) A method according to claim 61, wherein the plated film is copper.

Claim 84 (**New**) An apparatus for processing a substrate, said apparatus comprising:
a plating unit having a plating chamber for electroplating a substrate having fine grooves in a surface of the substrate and a seed layer on a surface of the fine grooves; and
an annealing unit having a chamber for annealing the substrate,
wherein said plating unit is structured to form a plated film on the seed layer by electroplating with applying a voltage to the seed layer and to etch the plated film by reversing the voltage.

Claim 85 (**New**) An apparatus according to claim 84, further comprising a polishing unit for polishing the substrate to remove the plated film on the substrate while leaving the plated film in the fine grooves of the substrate.

Claim 86 (**New**) An apparatus according to claim 85, wherein said polishing unit comprises a chemical mechanical polishing unit.

Claim 87 (**New**) An apparatus according to claim 85, wherein said polishing unit has a fixed abrasive.

Claim 88 (**New**) An apparatus according to claim 84, further comprising a cleaning unit for cleaning a polished substrate.

Claim 89 (**New**) An apparatus according to claim 84, further comprising a cap-plating unit for forming a protective film on a polished surface of metal in the fine grooves.

Claim 90 (**New**) An apparatus according to claim 84, further comprising a reinforcing seed layer forming unit for forming a reinforcing seed layer of the substrate.

Claim 91 (**New**) An apparatus according to claim 84, further comprising a film thickness measuring instrument for measuring a thickness of the plated film formed on the substrate.

Claim 92 (**New**) An apparatus according to claim 84, further comprising a bevel-etching unit for bevel-etching the substrate to remove the plated film formed on a peripheral portion of the substrate.

Claim 93 (**New**) An apparatus according to claim 88, further comprising a robot having a first hand and a second hand,

wherein said first hand transfers the substrate having the plated film to said cleaning unit, and said second hand transfers the cleaned substrate.

Claim 94 (**New**) An apparatus for processing a substrate, said apparatus comprising:
a plating unit having a plating chamber for electroplating a substrate having fine grooves in a surface of the substrate and a seed layer on a surface of the fine grooves; and

an annealing unit having a chamber for annealing the substrate,

wherein said plating unit is structured to form a plated film on the seed layer by electroplating with supplying a first current by a voltage to the seed layer and then supplying a second current to the seed layer.

Claim 95 (**New**) An apparatus according to claim 94, wherein the second current is larger than the first current.

Claim 96 (**New**) An apparatus according to claim 94, wherein said plating unit is structured to apply a reverse voltage to the seed layer for thereby etching the plated film formed on the substrate.

Claim 97 (**New**) A method for processing a substrate, said method comprising:
providing a substrate having fine grooves in a surface of the substrate and a seed layer on a surface of the fine grooves;

forming a plated film on the seed layer by electroplating with applying a voltage to the seed layer;

etching the plated film by reversing the voltage so as to suppress action of an additive and prevent formation of a protuberance on the fine grooves; and
annealing the plated film after said etching.

Claim 98 **(New)** A method according to claim 97, wherein said etching achieves uniformity of the plated film.